

Improving questions on

PHYSICAL ACTIVITY

Alice McGee & Fiona Andrews



sports council wales
cyngor chwaraeon cymru



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**The contents of the report reflect the views of the National Centre
for Social Research, not the Sports Council for Wales**

BACKGROUND

THE SPORTS COUNCIL FOR WALES (SCW) CURRENTLY INCLUDE ONE QUESTION ON PHYSICAL ACTIVITY (ALONGSIDE QUESTIONS ON INDOOR AND OUTDOOR SPORTS, CLUBS AND GROUPS) AS PART OF THEIR BIENNIAL SURVEY 'SPORTS COUNCIL FOR WALES ADULT SPORTS PARTICIPATION AND CLUB MEMBERSHIP IN WALES'.

This question aims to measure whether the physical activity target is being met, that is whether adults carry out physical activities of a moderate or vigorous level on five separate days a week for 30 minutes or more.

Following concerns regarding the overall quality of the data collected by this question (which can be found in Appendix B), the SCW commissioned the Question Design and Testing (QDT) Hub at the National Centre for Social Research (NatCen) to re-design the question and to then cognitively test the new version. Due to a tight timeframe, it was proposed that the cognitive phase would 'piggyback' onto some cognitive testing being carried out on the Health Survey for England (HSE), also looking at questions about physical activity.

1.1 Adults' Sports Participation Survey

The Adults' Sports Participation Survey (ASPS) is a survey of adults (aged 15+) looking at adults' involvement in sports and leisure activities in Wales. The question of interest collects information about the amount of physical activity carried out over the previous seven days. Survey estimates of physical activity levels, based on this question, have been found to vary at local authority level, and to vary considerably from estimates obtained from the Welsh Health Survey (WHS). Such variation cannot be explained solely by differences in sample size, and so SCW wished to commission an evaluation of the current ASPS question.

The Adults' Sports Participation Survey runs biennially with 22,000 respondents to the survey each year. Households are selected at random and one individual selected within each participating household. Market Research Wales conducted fieldwork in 2004/05 with the questionnaire interviewer administered (face-to-face).



1.2 Research Design

A three-stage research programme was proposed:

1. Desk review;
2. Cognitive testing; and,
3. Report writing and final recommendations submitted to SCW.

Below is an outline of what each of these stages entailed.

1.2.1 Phase 1 – Desk review

A desk review of the existing physical activity question was carried out and suggestions for initial improvements put forward. The rationale for these potential improvements (outlined in more detail in Chapter 2) was formulated through (a) the application of our existing experience of designing and testing survey questions, and (b) reference to relevant literature in this area. Specifically we made reference to recent testing conducted on physical activity questions for the National Diet and Nutrition Survey (NDNS) series and reviewed questions asked on other NatCen surveys, such as the Welsh Health Survey (WHS) and HSE.

1.2.2 Phase 2 – Cognitive testing

The re-designed question was evaluated through cognitive testing in March 2007. As only one question was to be tested, we combined this work with another NatCen cognitive project already planned. It was agreed that we would be able to use up to 20 minutes of interview time to test the revised version of this question. The cognitive testing took place in England rather than Wales though we did not expect this to be problematic as the testing aimed to examine general strategies people employ in answering the question and these strategies were expected to be broadly similar among people living in England and Wales. Piggybacking this test question on to another study meant that the costs of conducting the testing were considerably reduced.

1.2.3 Phase 3 – Recommendations

Following the cognitive test we conducted analyses using a content analysis approach. This report contains our final recommendations for improvement to the question following the desk review and cognitive testing.

1.3 Report Structure

Chapter 2 details the aims, rationale and process of the re-design of the physical activity questions.

Chapter 3 presents evidence from the cognitive interviews conducted in March 2007, on how successful or otherwise the revisions to the question were in assisting respondents in understanding and answering accurately the new questions on physical activity. This chapter also makes recommendations for final changes to the revised questions.

Chapter 4 lays out some additional options for consideration by the SCW and summarises the next stages following delivery of this report.

RE-DESIGN OF QUESTIONS

THIS CHAPTER DETAILS THE RE-DESIGN STAGE, OUTLINING CLEARLY EACH PROPOSED CHANGE AND THE SUPPORTING RATIONALE. THE FULL QUESTIONNAIRE AND ACCOMPANYING PROBES CAN BE FOUND IN APPENDIX C.

2.1 Changes to the questionnaire

2.1.1 Lead in question

SCW requested that a lead in question on sport activities be included in the cognitive testing, prior to the re-designed physical activity question, in order to replicate the context of the ASPS questionnaire. It was borne in mind that, because we proposed to piggyback the cognitive testing onto another project, one of the trade-offs was that the other physical activity questions could have an effect on ours in terms of context. Despite this, it was thought to be beneficial to ask a sport-related question prior to the re-designed physical activity question.

2.1.2 Proposed changes to the question

Introduction

Three main changes were made to the introduction for the question being tested:

- The proposed introduction acknowledged that the respondent had already told us about sports they participate in. It was anticipated that the respondent would see an overlap between the earlier questions on sports and those on physical activity and so it needed to be communicated that this would not matter, physical activity simply includes more activities than sport ones;

- Examples of physical activities that do not involve sport were given (walking from place to place, doing your housework or gardening); and

- A clear message was included that physical activity includes anything that involves movement.

Showcard

Showcard (B) lists examples of light, moderate and vigorous physical activities. Light activities are shown in grey. Showing the three types of physical activity aimed to highlight the distinction between the types, giving examples of what to include and importantly what not to include.

Literature on the use of showcards has shown that trade-offs exist when making decisions about whether or not to use them. Respondents are likely to approach the showcard in different ways. Broadly the approaches can be grouped into two categories:

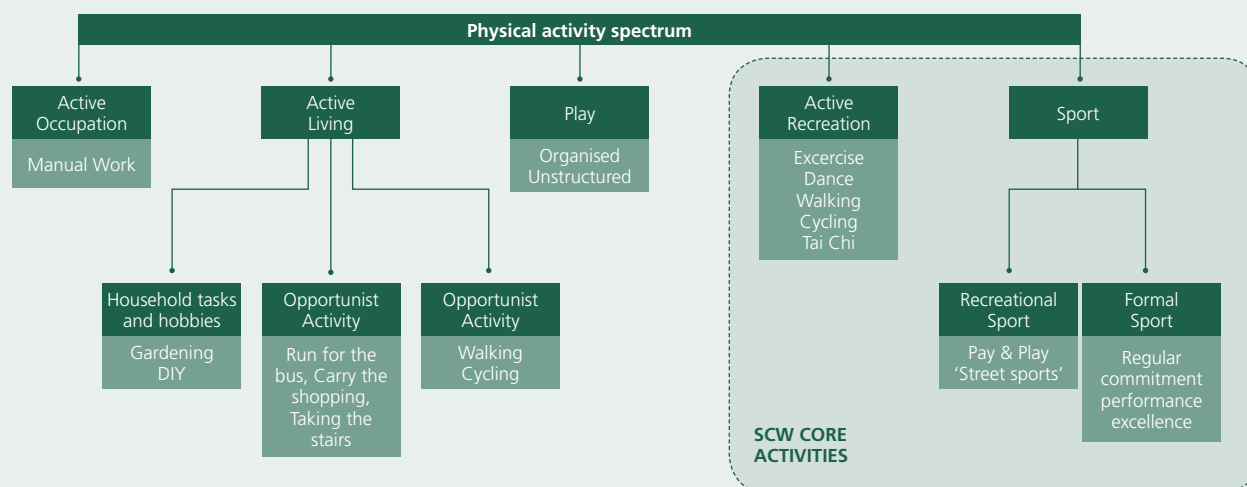
- (a) Respondents who understand that the showcard displays a list of examples and are able to think of additional activities they have carried out (not displayed on the card); and
- (b) Respondents who saw the showcard as displaying the whole list of activities to consider at this question, working through it thinking about whether they carried out each of the activities displayed, and not considering other activities not

on the list. It was deemed important that the interviewer probed fully at these questions.

Including the showcard, despite the approach taken by the second group of respondents, was recommended as it is still important to show some examples of types of physical activity rather than none at all. Showcards are particularly good for respondents who find it hard to volunteer answers or information and in these cases reduces burden.

Additional data

SCW requested that the question be re-designed to include a further level of data. In addition to collecting the general measure - of whether adults have carried out moderate or vigorous physical activities on five days of the week, at 30 minutes a day - the SCW also wanted to find the proportion of these physical activities that were 'SCW core activities'. These core activities include active recreation and sport and exclude active occupation, active living and play. These five groups are shown in the diagram opposite.

Figure 2-1 Summary of characteristics of interviewed respondents

The questions regarding physical activity were asked about in groups of three, for each of the seven days of the previous week. The three questions were:

- (a) whether any physical activity was carried out on that particular day;
- (b) what activities were carried out; and
- (c) how long each activity took.

Question length

Although the suggested structure of questions appeared longer than the original question, posing the questions in this format opens out the thought process into the three steps the respondent needs to take to elicit the necessary information. It allows the respondent to separate out the three components of the question and think about them individually. The respondent is led along a clear path towards the required answer. This approach was expected to be less burdensome for the respondent.

It was expected that this approach would take the same amount of time as the current question takes if it is answered sufficiently by the respondent (i.e. the respondent should work through the same issues in coming up with their answer). According to the SCW, the question took, on average, 5

minutes to complete which was less time than we had anticipated. However it may be the case that respondents became fatigued when answering the original question, as it is a relatively burdensome task, and so adopted a satisficing technique (i.e. giving don't know answers and guessing)¹. This would mean that, once the question is improved, it is likely to take longer to administer as it was expected that respondents would think more deeply about each of the activities they have carried out over the past week and how much time each one took. Despite this, it was anticipated that through using the new question there would be a reduction in measurement error in the data yielded.

In-house data manipulation

The subsequent calculations of (a) how much time was spent on physical activities and (b) whether the activities were 'SCW core activities' would be conducted in office:

- (a) The lengths of time respondents had given for each physical activity they had carried out would be amalgamated to arrive at a total figure for each day.
- (b) A comprehensive list (code frame) of physical activities would be drawn up (based on some early questionnaires)

and each activity given by the respondent coded into one of the five categories (and sub categories) outlined by the SCW (active occupation, active living, play, active recreation and sport). This would then allow the SCW to determine the proportion of time people spent conducting activities that fall into the SCW core categories.

2.1.3 Hypotheses

We set three hypotheses to test during the cognitive testing stage. These were:

1. Separating out the thought process into the three stages would enable and encourage respondents to think more deeply about their physical activity.
2. Displaying light, moderate and vigorous activities on the showcard (the light activities shown in grey) would help respondents understand the differences between the types of activity and what (and importantly what not) to include.
3. Respondents would approach the showcard in two different ways: (a) those who saw the card as displaying a list of examples and were able to think of additional activities they had carried out; and (b) those who saw the showcard as displaying a definitive list of activities to consider.

¹ Krosnick, J. 199

COGNITIVE PHASE, FINDINGS AND RECOMMENDATIONS

THIS CHAPTER PRESENTS FINDINGS FROM THE PHASE OF COGNITIVE INTERVIEWING WITH RESPONDENTS CONDUCTED IN MARCH 2007.

This stage aimed to assess whether the changes outlined in Chapter 2 led to improvements in respondents' understanding of the question and therefore in the quality of data yielded. Each section shows:

1. The group of questions that were cognitively tested;
2. An outline of the findings at that question; and,
3. Final recommendations for improvement.

3.1 Interview format and structure

Respondents were first asked to recall the past four weeks and answer whether they had taken part in any of the sporting activities on showcard A (Showcard A can be found in Appendix D). This question was intended to provide context (i.e. asking about sports then physical activity) to replicate the ASPS questionnaire.

Following this initial question, respondents were then asked to recall the previous four days and the moderate and vigorous physical activities that they had undertaken. Showcard B contained a list of examples of these types of physical activities (Showcard B can be found in Appendix E).

The question and probe sheet interviewers used to conduct the interviews is reproduced in Appendix C.

Appendix A contains further details on cognitive interviewing methods, the conduct of interviews and the analysis of data.

3.2 Sample members

Fourteen interviews were conducted in total. Table 3-1 below provides details on the characteristics of respondents interviewed as part of this study.

Cognitive interviews took place in respondents' homes and were conducted face-to-face, on a one-to-one basis, to ensure respondent confidentiality. In total the interviews lasted around an hour and a half, with the Sports Council for Wales section taking up the final 20mins. Interviews were recorded

with respondents' consent. Respondents were given a £20 High Street voucher as a token of our appreciation for taking part in the interview.

3.3 Cognitive findings

The following section details findings from the cognitive phase.

3.3.1 Sport activities undertaken in the last four weeks

An introductory question on sports undertaken in the last four weeks was included to provide respondents with a context to replicate the pattern of the questionnaire. This question was a combination of aspects of two early questions (on outdoor and indoor sports) asked in the current ASPS

Table 3-1 Summary of characteristics of interviewed respondents

Characteristics		No. with Characteristics
Gender of respondent	Male	5
	Female	9
Age of respondent	15-20	3
	21-30	5
	31-40	2
	41-50	4
	51-60	–
	65+	1

questionnaire. Cognitive respondents were first asked to consider sporting activities in the last four weeks, then move on to consider their physical activities in the last week. Although this question was not the focus of our test we included a few cognitive probes in order to set the context of our interview. The findings are reported in brief below.

Question 1 SHOWCARD A

Which, if any, of the games and activities shown on this card have you taken part in within the last 4 weeks ending yesterday?

Are there any activities not listed on the card that you have taken part in within the last 4 weeks? What were they?

PLEASE TICK WHICH ACTIVITIES THEY HAVE PARTICIPATED IN.

WRITE IN ANY OTHER ACTIVITIES.

Findings

Overall respondents found this question easy to answer. Respondents generated their answers after reading through the showcard, then determining whether they had taken part in any of the activities listed. Some difficulty was reported, this being due to the long timeframe that they were asked to think about (four weeks).

Some respondents had not taken part in any of the activities listed on Showcard A. Respondents who had taken part in at least one activity listed found the question easier to answer than those who had not, as they were looking for certain activities.

There was some uncertainty among respondents as to whether they should include walking as an activity at this question. Two approaches were then employed by respondents, those who excluded walking, and those who included it as part of the 'other' answer category. Those who included walking as an answer, reported doing so because they felt that without including it, it would appear as if they had done little activity over the past four weeks. One respondent who included this mentioned feeling that the activities

listed were for younger people, and were "out of his range".

On the whole, respondents were clear about the activities listed on the showcard, and were able to remember whether they had participated in any, or any activities similar which could be included. Cycling was included on more than one occasion as an 'other' activity, with these respondents having no difficulty deciding to include this.

Recommendations

- Retain the current question wording.
- Consider adding 'brisk walking' to the showcard as respondents may want to include it.
- Consider adding 'cycling' to the showcard.

3.3.2 Physical activities in the last week

The following questions were asked about in groups of three, this set of questions repeated for each day. Due to time constraints we were unable to ask these questions about the previous seven days and therefore interviewers were instructed to ask only about the last four days. It was felt that this approach would still enable us to fully explore the issues respondents faced in answering the revised questions.

The three questions were:

- Whether any physical activity was carried out on that particular day;
- What activities were carried out; and
- How long each activity took.

Questions

The next set of questions are about your physical activity over the last week. You have already told me about the sports you are involved in but now I also want to know about things like walking from place to place, doing your housework and gardening, as physical activity includes anything that involves movement.

SHOWCARD B

Showcard B gives some examples of light, moderate and vigorous physical activities. I am going to ask you to think about any moderate or vigorous physical activity, such as those listed on this card, that you have done over the last four days (starting with yesterday and working backwards to <day>).

Table 3-2 Summary of characteristics of interviewed respondents

Day one

Q2

Did you do any **moderate** or **vigorous** physical activity yesterday? Please think about all activities you did as well as the examples on showcard B.

Yes

☐

Go to Q3

No

☐

Go to Q5

Q3

What activities did you do?
Activity 1
Activity 2
Activity 3
Activity 4
Activity 5
Activity 6
Activity 7
Activity 8

Q4

How long did you spend doing the activity?	
Hours	Minutes

Findings

Respondents did not have problems deciding whether they had carried out physical activity on each of the four days and were able to provide a Yes or No answer to question 2.

Strategy for recalling physical activities

When it came to answering question 3, regarding specific physical activities undertaken, respondents tended to work through a similar pattern:

- Firstly respondents thought back over what that particular day had consisted of, what they had done that day (e.g. go to work, school, looked after children or attended particular classes or activities).
- The second step was thinking about whether physical activities had fitted into their movements that day and what they were.
- The third stage was assessing what kind of physical activities these were and whether they should be included in the list at this question.

It is important to note that this process can happen very quickly or quite slowly and is not necessarily consciously separated out, by the respondent, in these three stages.

Time period

On the whole respondents understood that we required information about the previous day though some asked for clarification that we were asking about this day only rather than the last four weeks, in line with the opening question. Respondents tended to think back over the last four days, taking each day separately in turn.

Ease and difficulty of recall

Physical activities appeared to fall into two main categories: formal and informal. Respondents tended to find more formal activities easier to remember due to their rigid and set structure. A second factor that affected respondents' ability to recall physical activities was how regularly or often they conducted them. Respondents found activities easy to remember if they were regular or routine. However, despite these activities being easy to recall they could be problematic in the sense that the respondent would think generally about how much time they usually spend conducting the physical activity rather than on that specific occasion.

Activities that were unusual or non-routine were, on the whole, more difficult to remember, particularly as respondents were asked about days further into the past. Respondents also reported difficulty in recalling physical activities on particular days where

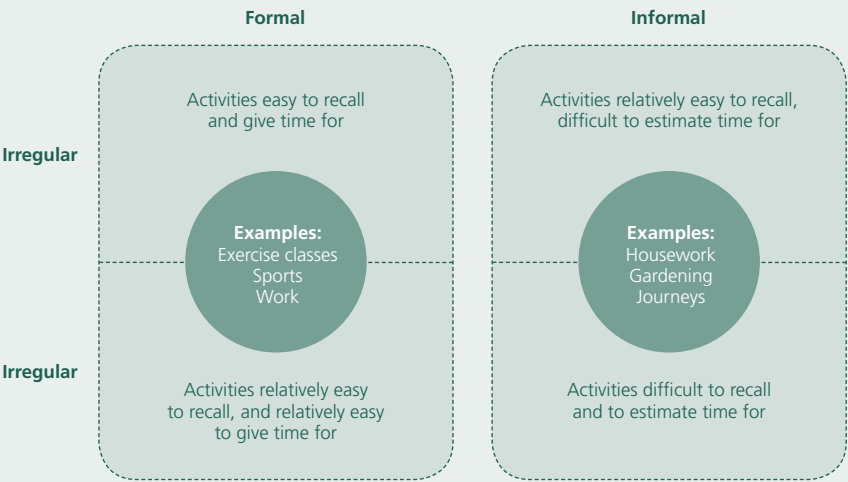
there were no specific tasks or structure. In these cases days could merge together, making it hard to remember what had taken place.

Time spent on each physical activity

Respondents were also asked, at question 4, to state how long a period of time they had conducted each physical activity listed at question 3. Overall, respondents were able to give lengths of time for which they conducted each physical activity though the accuracy ranged depending on how formal and how regular each physical activity was.

The simple diagram below shows how these factors interacted with respondents' ability to recall specific physical activities and the length spent on each activity. It also gives examples of formal and informal types of physical activity.

Figure 3-1 Interaction of types of physical activity and examples



Recall over a week period

Respondents generally did not have problems thinking back over the last few days; further back than this could be problematic and thus respondents were more likely to miss out activities on these days.

Levels of physical activity

Respondents were given a showcard containing examples of light, moderate and vigorous physical activities. The light activities were displayed in grey to indicate that they should not be included (i.e. not moderate or vigorous).

Respondents were generally able to differentiate between activities they should include and those they should not, for instance one respondent included window cleaning and hedge cutting but decided not to include pottering in his greenhouse as this was not seen as "heavy". Occasionally respondents would include light activities at this question though these cases tended to be ones in which the respondent personally felt their activities should be included. For example one respondent wanted to include her light activities so she would have something to report, saying:

"The trouble is you don't want to look too lazy" (Female, 31).

This raises the issue of **social desirability** and how respondents may over-report physical activities where they are seen as socially desirable behaviours (Couper, Singer & Tourangeau, 2003)². One way of dealing with this may be to ask respondents about light activities in addition to moderate and vigorous ones. However, although respondents commented that they wanted to include light activities, to

have something to report, this demonstrated that they generally understood the concept of excluding these activities and thinking only about "heavier" ones. These findings support our second hypothesis, outlined in section 2.1.3. Displaying light physical activities in addition to moderate and vigorous ones appears to have assisted respondents in determining which activities to include and which to leave out.

Understanding and defining levels of physical activity

Respondents were probed on their understanding of the words light, moderate, and vigorous physical activities. One respondent read the activities listed on the showcard when asked about physical activities.

Light physical activity

Light activity was described in a variety of ways, such as:

- Easy tasks;
- General day-to-day activities;
- Non-tiring activities;
- Tasks that can take a long time and that do not have an effect;
- Activities that do not cause you to break a sweat;
- Activities that do not cause the heart beat to quicken, more of a rhythm; and
- A step down from moderate activity.

Moderate physical activity

Moderate physical activity was described as being:

- A task that would not make you out of breath;

- An activity that leaves you mildly out of breath;
- Light, usual everyday housework, such as re-potting a few plants;
- A task you can sustain for about 1.5 hours, but then becomes a little more strenuous than light;
- An activity that could not be kept up all day, rather a few hours; and
- A specific activity for which the aim is not to get fit e.g. cleaning the windows.

Specific comments included:

"Not easy, not hard" (Female, late 30s)

"Something that makes you slightly out of breath, that gets your heart pumping, that isn't a day-to-day general walking... like brisk walking when you get there you feel slightly energised rather than a sloping sort of thing" (Female, 31)

"An activity that I would consider would slightly elevate the heart rate" (Female, 48)

Vigorous physical activity

Respondents were in agreement that vigorous physical activity was more 'active' than light or moderate activity. Some descriptions respondents gave included:

- Using all the muscles of the body;
- A sport;
- An activity with a more competitive edge;
- An activity done for a purpose (e.g. to lose weight or keep fit); and
- An activity where you get out of breath.

² Couper, Mick P., Eleanor Singer, Roger Tourangeau. "Understanding the Effects of Audio-CASI on Self-Reports of Sensitive Behavior." *Public Opinion Quarterly*, 67 (3): 385-395. 2003.

Classifying activities (light, moderate or vigorous)

Respondents occasionally commented that the activity itself was less important than the time it took to complete it. For example vacuuming for five minutes would be a light activity whereas an hour of energetic vacuuming could be classified as moderate or even vigorous physical activity.

Use of Showcard B and physical activities

As outlined in Chapter 2, respondents fall into two groups when using showcards:

(a) Respondents who understand that the showcard displays a list of examples and are able to think of additional activities they have carried out; and

(b) Respondents who saw the showcard as displaying the whole list of activities to consider at this question, working through it thinking about whether they carried out each of the activities displayed, and not considering other activities.

As we had hypothesised in section 2.1.3, respondents tended to use the

showcard as a definitive list of activities **(b)** despite the question wording emphasising that these are intended as examples, occasionally respondents understood that the showcard was a list of examples. Activities recorded at Q3 were activities displayed on the showcard, common activities being ‘brisk walking’ and ‘heavy housework’. Additional activities given (i.e. on top of the activities on showcard B) can be grouped into three categories. These are shown in Table 3.3 below.

Heavy housework

This example caused specific comprehension problems in that respondents were generally unsure what level of housework to include. The examples are not felt to be particularly helpful. Some respondents interpreted ‘spring cleaning’ as being a big task that takes place once a year and although they had done a full and thorough clean lasting a few hours they did not classify this as heavy housework as it was not a one off task. Others felt that they had done heavy housework (involving extensive vacuuming, cleaning floors and toilets) but that this “didn’t count” because it was not ‘spring cleaning’ or cleaning windows.

Strategies for recalling the time spent on each physical activity

As stated earlier in this chapter respondents were asked to state how long a period of time they had conducted each physical activity. Figure 3.1 (on page 10) showed a simple typology of how respondents recall physical activities and the time spent conducting them. Taking this analogy further respondents fell into four categories in terms of how they approached thinking about timing of physical activities:

- Those who participated in ‘formal’, fixed physical activities and were able to give a time easily. These timings were likely to be fairly accurate as the activity took place for a set time (e.g. dance class or football match). Having said this, it should be borne in mind that respondents may simply give an hour (i.e. the time of the class) whereas this could include getting changed, warming up or cooling down which may cause reporting of inaccuracies.
- Those who participated in ‘informal’ physical activities but were able to give relatively precise timings. For example they may have looked at the clock or thought about other things they had done that surrounded this one (e.g. watching television, preparing meals or going out to collect children from school).
- Those who had conducted ‘informal’ activities and were able to ‘work out’ the time they had spent carrying them out thinking about other activities they had done that day.
- Those who had taken part in ‘informal’ activities and provide a guess or rough estimate of the time they had spent conducting them.

Table 3-3 Additional activities

Everyday activities away from home	Housework/ Gardening	Exercise
Shopping	Changing bed linen	Dance class
Scouting	Moving furniture	Going to the gym
Using machinery (at work)	Hedge cutting	

Respondents generally found it easier to recall the time they had spent on each physical activity on the first few days and this task became more difficult thinking further back.

Physical activity in the workplace

An important requirement for the Sports Council for Wales' national estimates is the inclusion of any moderate or vigorous physical activity which may happen at work. This raises the issue of whether the question, as it is currently worded, compels people to think about physical activity undertaken in the workplace operating machinery for example.

Due to the fact that the sample for the cognitive testing did not contain many people in work, it is difficult to say indefinitely whether the question encourages people to include physical activity of this nature in their answers. Only one respondent in our sample explicitly mentioned having thought about work. On being asked the question she wondered whether to include work, before deciding to include it as she felt her job constituted moderate physical activity.

Respondents' interpretations of the questions

Respondents were asked what they understood the questions to be asking. Responses included:

"It's looking for people who are doing something else, than the general, light, everybody-does-it activities" (Male, 43)

"To see if you do anything other than just the general, which is light..." (Female, 31)

Recommendations

- The strategies respondents used in answering the questions appears to support our hypothesis, stated in section 2.1.3. By separating out the question into three distinct sections, respondents were able to consider their movements in more detail. We therefore recommend retaining this question structure and wording.
- Respondents also appeared to find the light, moderate and vigorous categories helpful and thus we recommend keeping these groups on the showcard.
- As respondents tended to use the showcard as a definitive list we recommend improving the examples contained there, particularly for heavy housework.
- **(a)** Add 'light' to housework in the light activities category;
- **(b)** Remove 'vacuuming' from light category;
- **(c)** Replace spring cleaning with 'moving furniture' and 'cleaning floors';
- **(d)** Add 'carrying heavy shopping bags' to the list moderate activities.
- To ensure that people are correctly including physical activity undertaken at work, in the workplace, we suggest adding 'active tasks that are part of your work' to the initial introduction to the question.

NB: It should be borne in mind that further testing would be necessary to explore the effect these suggested changes to the question wording and showcard would have on respondents' understanding and overall data quality.

Recommended questions

The next set of questions are about your physical activity over the last week. You have already told me about the sports you are involved in but now I also want to know about things like walking from place to place, active tasks that are part of your work, doing your housework and gardening, as physical activity includes anything that involves movement.

SHOWCARD B

Showcard B gives some examples of light, moderate and vigorous physical activities. I am going to ask you to think about any moderate or vigorous physical activity, such as those listed on this card, that you have done over the last four days (starting with yesterday and working backwards to <day>).

RECOMMENDATIONS AND NEXT STEPS

THIS REPORT HAS OUTLINED RECOMMENDATIONS FOR SCW TO CONSIDER REGARDING THE QUESTIONS ON PHYSICAL ACTIVITY. MORE GENERAL RECOMMENDATIONS OR OPTIONS FOR SCW TO CONSIDER ARE SHOWN BELOW:

Further options to consider

- Consider moving to a Computer Assisted Personal Interviewing (CAPI) administered questionnaire rather than paper and pen (PAPI). This would give more flexibility in administering the questions and cut out the data entry stage.
- Consider asking about light physical activities and then moderate and vigorous activities separately (three groups in total). This approach would depend on overall length of questionnaire and cost.
- Consider dividing up the questions to ask about each area of physical activity separately (active occupation, active living, play, active recreation and sport). This approach would also depend on length of overall questionnaire and cost.
- Consider conducting a second round of cognitive testing, dedicated purely to the ASPS questionnaire, with a larger and more diverse sample of respondents.

APPENDIX A

TECHNICAL DETAILS OF COGNITIVE PHASE

This appendix describes in further detail the design and conduct of the cognitive testing.

Study Design

This project was designed to test the physical activity questions asked as part of the Adults Sports Participation Survey carried out by the Sports Council for Wales. The study was designed with three separate stages: Desk review, Cognitive testing and Recommendations. After the desk review had been carried out, using expertise and knowledge of senior researchers in the Question Design and Testing (QDT) Hub, the questions were re-written and these new versions were tested using cognitive interviewing methods.

Cognitive respondents were firstly asked to recall the past four weeks and answer whether they had completed any activities on the Showcard A (Showcard A can be found in Appendix D). They were then asked some probes about how easy or difficult they found answering the question. Using Showcard B respondents were asked to recall the previous four days and the moderate and vigorous physical activities that they had undertaken (Showcard B can be found in Appendix E). A mixture of think aloud and

cognitive probing techniques were used to evaluate the record. After respondents had been asked to recall any moderate and vigorous physical activity, working backwards over four days, they were asked a number of specific probes designed to ascertain how they went about answering the question, and whether they had any difficulty thinking about activities of a vigorous or moderate nature. The question and probe sheet can be seen in Appendix C.

Respondents were encouraged to 'think-aloud' as they answered the questions. Interviews were tape recorded and conducted by NatCen researchers and field interviewers trained in cognitive methods. Tapes were partly transcribed, and reviewed so that detailed notes could be made. Notes were analysed using a content analysis approach described below.

We had aimed to arrive at a total of 10 interviews but made the decision to conduct an additional four to ensure we had adequately covered a spread of characteristics. Characteristics identified as being associated with physical activity were:

- Age; and
- Gender.

Cognitive Methods

Cognitive interviewing methods, which are derived from cognitive psychology, enable researchers to examine (in greater detail) the question and answer process, helping to identify problems with questions and possible solutions. Cognitive interviewing techniques focus on four main processes:

- How respondents understand and interpret questions;
- How respondents recall the information required to answer questions;
- The judgements they make as to what information to use when formulating their answers; and,
- How to respond to the questions.

The two most frequently used cognitive interviewing techniques are 'think aloud' and probing. In this study, a mixture of think aloud and probing techniques were used. In the think aloud technique, respondents were asked to say out loud what they are thinking as they go about answering the task. For example, respondents would be encouraged to articulate what they think a particular data item means, what information they are drawing on to complete each section, what decisions they make about what

they are being asked to provide or what information is required to answer it and how they provide their (final) information for each item.

In the probing technique the interviewer will ask specific, usually scripted, questions which provide similar information. These ‘probes’ are partly pre-scripted and provide a guide to the topics to be covered in the cognitive interview. Probing was carried out retrospectively, once the respondent had answered about physical activity on each day. A copy of the cognitive probes used can be found in Appendix C.

Recruitment

Cognitive testing for this study was ‘piggybacked’ onto some cognitive testing being carried out by another NatCen project, the Health Survey for England (HSE). For this study respondents were separated into three groups: Adults aged 16+; Children aged 11-15; and Proxy parental interviews with parents of children under 11. For the purpose of our study it was decided that the most relevant people to interview would be the proxy parents. The rationale behind this was that although they had just answered physical activity questions, they were answering on behalf of their children, and so had yet to think about their own personal physical activity over the previous seven days. Some respondents

who had answered the adult HSE questionnaire also participated in the SCW testing and others had not been involved in the HSE work at all.

Recruitment for the cognitive testing of the questions was carried out by the interviewers and researchers themselves. The sample was made up of respondents who had previously taken part in the Health Survey for England and agreed to be re-contacted. The areas in which interviewing took place were:

- Lincoln, Lincolnshire;
- Manchester, Lancashire;
- South West and East London; and,
- York, Yorkshire.

Conduct of Interviews

Cognitive interviews took place in respondents’ homes and were conducted face-to-face, on a one-to-one basis, to ensure respondent confidentiality. In total the interviews lasted around an hour and a half, with the Sports Council for Wales section taking up the final 20mins. Interviews were recorded with respondents’ consent. Respondents were given a £20 High Street voucher as a token of our appreciation for taking part in the interview.

Analysis

The members of the research team and the field interviewers, all of whom were trained in cognitive methods, made detailed notes on their cognitive interviews, with reference to the recording of the interview. These notes, recordings of the interviews and the completed test questionnaires were reviewed as part of the analysis process.

Notes were analysed using a content analysis approach based on Framework, an analytic tool developed by the Qualitative Research Unit at NatCen. A matrix was set up, which listed the respective areas of the Record we tested across the page and cases down the page. The matrix included a summary of the characteristics of respondents; such as their gender and age. Under each question a summary was made of each respondent’s understanding of the question, recall strategies used, judgements made in formulating an answer and the answer provided. Any other problems were also recorded. Thus data could be read horizontally as a complete case record for an individual, or vertically by question, looking across all cases.

Once the matrix was completed the data were reviewed. In reviewing the matrix the full range of problems with the question were explored.

APPENDIX B

ORIGINAL QUESTION

Question 12

The next question is about the last 7 days ending yesterday. We would like you to remember what you did on each of the last 7 days and tell us how much time you spent exercising to at least a moderate level on each day.

By moderate exercise, we mean something that has made you breathe a bit harder and your heart beat a bit faster for 10 minutes or more. A few examples of the sorts of physical activity we are referring to are shown on this card (**SHOWCARD 8**) and include activities such as work, DIY, gardening and climbing stairs. These are just examples and are the minimum levels we are interested in. So, if you

exercised beyond this level (e.g. you played football, you went to aerobics class) please include this time as well.

Interviewer note: Respondents are allowed to accumulate exercise time – so if a respondent spent 15 minutes brisk walking, 15 minutes heavy gardening and 15 minutes swimming on the same day please code this as ‘about 45 mins’. When accumulating exercise time only activities which were at least 10 minutes in duration should be counted.

So how much exercise did you do to **at least** a moderate level yesterday?
(INTERVIEWER TO WORK BACKWARDS)

Q13

Tick start		None	Less than 15 minutes	About 15 minutes	About half an hour	About 45 minutes	About an hour	More than an hour	Don't know	
	Monday	1	2	3	4	5	6	7	8	(543)
	Tuesday	1	2	3	4	5	6	7	8	(544)
	Wednesday	1	2	3	4	5	6	7	8	(545)
	Thursday	1	2	3	4	5	6	7	8	(546)
	Friday	1	2	3	4	5	6	7	8	(547)
	Saturday	1	2	3	4	5	6	7	8	(548)
	Sunday	1	2	3	4	5	6	7	8	(549)

APPENDIX C

COGNITIVE QUESTION AND PROBE SHEET

Stage 1: Introducing the survey

Now I am going to ask a few more questions, this time for a separate study. The Sports Council for Wales are looking to improve their questions on Physical Activity. We want to find out whether people have difficulties with the questions, and if so, which parts. We also want to know whether there are any confusing terms used in the questions.

I am interested in the thought process you go through in getting to your answer, rather than the answer itself.

Stage 2: Questions

SHOWCARD A

INTERVIEWER: READ WORDING BELOW EXACTLY AS WRITTEN.

Which, if any, of the games and activities shown on this card have you taken part in within the last 4 weeks ending yesterday?

Are there any activities not listed on the card that you have taken part in within the last 4 weeks? What were they?

PLEASE TICK WHICH ACTIVITIES THEY HAVE PARTICIPATED IN.

WRITE IN ANY OTHER ACTIVITIES.

Outdoor games	Tick	Indoor games	Tick
Archery		Aerobics	
Athletics		Badminton	
Baseball		Basketball (indoor)	
Basketball (outdoors)		Cricket (indoor)	
Cricket (outdoor)		Gymnastics	
Golf		Hockey (indoor)	
Hockey (outdoor)		Judo	
Lacrosse		Karate	
Road Running / Cross Country		Dance	
Jogging		Netball (indoor)	
Netball (outdoor)		Squash	
Rugby		5-a-side soccer	
Soccer (outdoor)		Swimming	
Tennis		Table Tennis	
Volleyball		Volleyball (indoor)	
		Yoga	
Other		Other	
Other		Other	
Other		Other	

Probes

- How did you arrive at your answer?
- How easy or difficult did you find answering this question?

The next set of questions are about your physical activity over the last week. You have already told me about the sports you are involved in but now I also want to know about things like walking from place to place, doing your housework and gardening, as physical activity includes anything that involves movement.

SHOWCARD B

Showcard B gives some examples of light, moderate and vigorous physical activities. I am going to ask you to think about any moderate or vigorous physical activity, such as those listed on this card, that you have done over the last four days (starting with yesterday and working backwards to <day>).

INTERVIEWER:

For the following question, you need to find out from the respondent what activities they did on the previous day and list them. Then enter in the grid, how long, in hours and/or minutes, they spent completing each activity.

There is extra space where you can enter any additional activities that the respondent did within the last 4 days at the end of the questionnaire. Please remember to enter which day you are referring to.

EXAMPLE

Example day _____

What activities did you do?		How long did you spend doing the activity?	
		Hours	Minutes
Activity 1	Jogging	0	20
Activity 2	Playing tennis	1	30
Activity 3	Gardening	2	15

Day one _____

Q2 Did you do any **moderate** or **vigorous** physical activity yesterday? Please think about all activities you did as well as the examples on showcard B.

Yes

☐

Go to Q3

No

☐

Go to Q5

Q3

What activities did you do?	
Activity 1	
Activity 2	
Activity 3	
Activity 4	
Activity 5	
Activity 6	
Activity 7	
Activity 8	

Q4

How long did you spend doing the activity?	
Hours	Minutes

Q3 Probes

- How did you go about answering the question?
- What sorts of activities did you think about?
- Was there anything you weren't sure whether to include? What? Why?
- What do you think the question is asking for?
- Did you find the question easy or difficult to answer? Why?

Q4 Probes

- How did you arrive at your answers?
- Was remembering the time you spent on each activity easier for some than others? Which ones? Why?
- Did you find the question easy or difficult to answer? Why?

General Probes

- How would you describe moderate physical activity?
- How would you describe vigorous physical activity?
- What are the differences between light, moderate and vigorous physical activities?

Day two _____

Q5 Now thinking about the day before yesterday, that is <day>, did you do any **moderate** or **vigorous** physical activity on <day>? Again, please think about all activities you did as well as the examples on showcard B.

Yes ☐ **Go to Q6**

No ☐ **Go to Q7**

Q6

What activities did you do?	
Activity 1	
Activity 2	
Activity 3	
Activity 4	
Activity 5	
Activity 6	
Activity 7	
Activity 8	

Q7

How long did you spend doing the activity?	
Hours	Minutes

Q6 Probes

- How did you go about answering the question?
- What sorts of activities did you think about?
- Was there anything you weren't sure whether to include? What? Why?
- Did you find the question easy or difficult to answer? Why?
- How easy or difficult was it to remember what you did on this day?

Q7 Probes

- How did you arrive at your answer?
- Was remembering the time you spent on each activity easier for some than other? Which ones? Why?
- Did you find the question easy or difficult to answer? Why?

Day three _____

Q8 Now thinking about the day before that, that is <day>, did you do any **moderate** or **vigorous** physical activity on <day>? Again, please think about all activities you did as well as the examples on showcard B.

Yes ☐ **Go to Q9**

No ☐ **Go to Q11**

Q9

What activities did you do?	
Activity 1	
Activity 2	
Activity 3	
Activity 4	
Activity 5	
Activity 6	
Activity 7	
Activity 8	

Q10

How long did you spend doing the activity?	
Hours	Minutes

Q9 Probes

- How did you go about answering the question?
- What sorts of activities did you think about?
- Was there anything you weren't sure whether to include? What? Why?
- Did you find the question easy or difficult to answer? Why?
- How easy or difficult was it to remember what you did on this day?

Q10 Probes

- How did you arrive at your answer?
- Was remembering the time you spent on each activity easier for some than other? Which ones? Why?
- Did you find the question easy or difficult to answer? Why?

Day four _____

Q11 Now thinking about the day before that, that is <day>, did you do any **moderate** or **vigorous** physical activity on <day>? Again, please think about all activities you did as well as the examples on showcard B.

Yes ☐ **Go to Q12**

No ☐ **Go to Q14**

Q12

What activities did you do?	
Activity 1	
Activity 2	
Activity 3	
Activity 4	
Activity 5	
Activity 6	
Activity 7	
Activity 8	

Q13

How long did you spend doing the activity?	
Hours	Minutes

Q12 Probes

- How did you go about answering the question?
- What sorts of activities did you think about?
- Was there anything you weren't sure whether to include? What? Why?
- Did you find the question easy or difficult to answer? Why?
- How easy or difficult was it to remember what you did on this day?

Q13 Probes

- How did you arrive at your answer?
- Was remembering the time you spent on each activity easier for some than other? Which ones? Why?
- Did you find the question easy or difficult to answer? Why?

THANK THE RESPONDENT

This is where you can write any additional activities that the respondent may have done within the last 4 days. Please remember to enter which day you are referring to.

EXAMPLE

Example day _____

Day number	Day	What activities did you do?	How long did you spend doing the activity?	
			Hours	Minutes
One	Monday	Heavy housework	1	30
Four	Thursday	Jogging		20

Day number	Day	What activities did you do?	How long did you spend doing the activity?	
			Hours	Minutes

APPENDIX D

SHOWCARD A

OUTDOOR GAMES	INDOOR GAMES
Archery	Aerobics
Athletics	Badminton
Baseball	Basketball (indoor)
Basketball (outdoors)	Cricket (indoor)
Cricket (outdoor)	Gymnastics
Golf	Hockey (indoor)
Hockey (outdoor)	Judo
Lacrosse	Karate
Road Running / Cross Country	Dance
Jogging	Netball (indoor)
Netball (outdoor)	Squash
Rugby	5-a-side soccer
Soccer (outdoor)	Swimming
Tennis	Table Tennis
Volleyball	Volleyball (indoor)
	Yoga

APPENDIX E

SHOWCARD B

EXAMPLES OF PHYSICAL ACTIVITY
Light physical activities
Housework (eg. vacuuming, dusting)
Walking at an average pace
Light gardening (eg. weeding)
Moderate physical activities
Brisk walking
Golf
Dancing
Swimming
Cycling
Heavy housework (eg. spring cleaning, cleaning windows)
Heavy gardening (eg. digging)
Vigorous physical activities
Running
Jogging
Squash
Swimming lengths
Aerobics
Fast cycling
Football

